UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/732,250	12/07/2000	Vamsi Krishna Sangavarapu	JP920000280US1	9490

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ART UNIT	PAPER NUMBER
2124	

DATE MAILED: 03/10/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

		Application No		Applicant(s)	
Office Action Summary		09/732,250		SANGAVARAPU ET AL.	
		Examiner		Art Unit	
		Insun Kang		2124	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE _3_ MONTH(S) FROM
THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed
  after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
  Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any
  earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _2/26/2004_.

2a)☒ This action is **FINAL**.   2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is
   closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) _1-18_ is/are pending in the application.

   4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) _1-18_ is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

   Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

   Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

   a)☐ All   b)☐ Some * c)☐ None of:

   1.☐ Certified copies of the priority documents have been received.

   2.☐ Certified copies of the priority documents have been received in Application No. _____.

   3.☐ Copies of the certified copies of the priority documents have been received in this National Stage
      application from the International Bureau (PCT Rule 17.2(a)).

   * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☒ Notice of References Cited (PTO-892)

2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3)☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
   Paper No(s)/Mail Date _____.

4)☐ Interview Summary (PTO-413)
   Paper No(s)/Mail Date. _____ .

5)☐ Notice of Informal Patent Application (PTO-152)

6)☐ Other: _____.

DETAILED ACTION

1.   This action is in response to the amendment filed 1/26/2004.

2.   As per applicant's request, claims 1, 7 and 13 have been amended. Claims 1-18

are pending in the application.

Claim Rejections - 35 USC § 102

3.   The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that

form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4.   Claims 1-18 are rejected under 35 U.S.C. 102(e) as being anticipated by

Alverson et al. (US 6,480,818) hereinafter referred to as "Alverson."

        In regards to claims 1, 7, and 13, Alverson discloses:

-checking a breakpoint data structure to determine if the data structure has an entry for

a breakpoint known to a debugging process for a certain address where a breakpoint

fired (col 10 lines 34-53; col 11 lines 19-31; col 14 lines 39-64; see col 11 lines 31-50,

"if the nub needs to access various data structures ... ensuring that the data structures

are in the proper state", and col 13 lines 28-49, "The breakpoint handler then

determines ... and retrieve the information specific to this breakpoint").

-if no entry is found by the checking of the data structure for the entry for the known

breakpoint, verifying if a breakpoint condition continues to exist at the address where

the breakpoint fired (col 14 lines 39-64; col 17 lines 20-39; See col 14 lines 39-64, "set

the conditional breakpoints ... to the debugger ... if the specified condition is true at the

time that the breakpoint is hit...having the nub save the information about the condition."

See also col 6 lines 20-59 col 10 lines 30-54 and col 14 lines 39-64).

-if said breakpoint condition does not exist, identifying said breakpoint as a zombie

breakpoint (col 14 lines 39-64; col 17 lines 20-39; col 6 lines 20-59; col 7 lines 35-51).

        -- In regard to claims 2, 8, and 14, Alverson discloses a special breakpoint

instruction at said address, being the exception location (col 6 lines 20-59, col 7 lines

11-50, col 10 lines 30-53; col 14 lines 39-64; col 17 lines 20-39).

        -- In regard to claims 3, 9, and 15, Alverson discloses an illegal breakpoint

instruction(col 16 lines 22-40).

        -- In regard to claims 4,10, and 16, Alverson discloses special debug register

(See col 2 lines 66-67, col 3 lines 1-33, and col 5 lines 11-35).

        -- In regard to claims 5, 11, and 17, Alverson discloses physical settings for

causing a breakpoint exception at a particular location are detectable from a breakpoint

handler.   See col 7 lines 51-67 and col 8 lines 1-25, col 10 lines 31-43, and col 13 lines

28-49.

        -- In regard to claims 6, 12, and 18, Alverson discloses breakpoint removal logic.

See col 16 lines 41-61, col 20 lines 11-38, and col 7 lines 12- 23 and lines 35-67.

Response to Arguments

5.   Applicant's arguments filed 1/26/2004 have been fully considered but they are

not persuasive.

The applicant has asserted, in substance, the following:

(A) Applicant admitted, "Alverson recognizes and deals with the same zombie

breakpoint problem as the present invention (pg 8, paragraph 3 of applicant remarks).

However, the applicant argued that "Alverson handles this problem in a different

manner, and thus not only fails to suggest the present claimed invention, but actually

teaches away from the present invention (pg 8 paragraph 3):"

The applicant pointed out that the entry for breakpoint is not found because "the

breakpoint is temporarily removed from the line of code so that the instruction for which

the breakpoint was substituted can be replaced and executed (pg 10 paragraph 2)." The

applicant emphasized that, in the present invention, "the conventional arrangement is

maintained, according to which upon encountering a breakpoint the breakpoint is

temporarily removed from the line of code so that the instruction for which the

breakpoint was substituted can be replaced and executed. That the breakpoint is

temporarily removed is clear from the language of the application, which states that the

breakpoint cannot be found, indicating the breakpoint has been removed (pg 10

paragraph 2)."   The applicant argued that this is contrast to the Alverson's disclosed

"out-of-line instruction emulation" method because "the processing of the breakpoint has

been performed without removing the BREAK instruction from the target code

instructions (pg 10 paragraph 1)" in the teachings by Alverson.

In response, the examiner strongly contends that the claim limitations are met by

the reference for the following reasons:

1) Alverson deals with the problem of a breakpoint technique for a sequential

environment where only one thread can execute at a time when used in a multithreaded

environment (col 6 lines 20-67). Alverson teaches that this technique of temporarily

removing the breakpoint in a multithreaded environment can cause a "zombie"

breakpoint problem because another thread may "execute the replaced instruction

instead of the breakpoint, (col 6 lines 50-59). Alverson solves this problem using "out-

of-line instruction emulation so that an instruction replaced with a breakpoint instruction

does not need to be returned to its original location for execution (col 7 lines 36-51; col

4 lines 39-64; see also col 10 lines 30-54; col 11 lines 1-49; col 11). The applicant

emphasized that "the processing of the breakpoint has been performed without

removing the BREAK instruction from the target code instruction....(emphasis added) in

the teaching by Alverson. (pg 10 lines 1-4)." However, the examiner points out that this

method is used when the out-of-line instruction emulation is performed (see col 17 lines

20-40) so that "if another target thread had executed the same instructions while the

breakpoint for the first target thread was being processed, the second target thread will

also encounter the breakpoint instead of inadvertently missing a temporarily absent

BREAK instruction (pg 10 lines 1-4)." Alverson clearly teaches that "a breakpoint

could be added and processed **in-line**, either requiring all of the threads to halt **during**

any temporary return of the replaced instruction to be executed in-line after the

breakpoint had been processed or accepting that some threads may miss the

breakpoint during the temporary return. If it is instead indicated ... that the

instruction is allowed to be emulated,... the necessary modifications to the instruction to

allow it to be emulated in its new memory location (col 17 lines 20-40)."

Therefore, Alverson not only deals with the zombie breakpoint but also handles

the problem accordingly using "out-of-line" emulation.

(B) Applicant asserted that Kakivaya "deals with synchronization issues arising from

multithreading, but does not concern breakpoint handling by a debugging program (pg

11 paragraph 2)."

In response, the examiner disagrees. Kakivaya teaches the synchronization

services to resolve the race conditions occurred in concurrent execution. The zombie

breakpoint, in view of the terminology defined in the instant specification, occurs in the

context of race conditions. Therefore, the examiner considers the teachings of Kakivaya

relevant. However, the applicant has amended claims 1, 7 and 13 and the scope of

theses claims has changed due to the claim limitations. Alverson teaches all claim

limitations in claims 1-18, therefore, accordingly, the examiner withdraws the Kakivaya

reference in view of amendments.

Conclusion

6.   Applicant's amendment necessitated the new ground(s) of rejection presented in
this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP
§ 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37
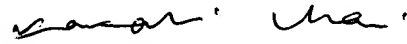CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE
MONTHS from the mailing date of this action. In the event a first reply is filed within
TWO MONTHS of the mailing date of this final action and the advisory action is not
mailed until after the end of the THREE-MONTH shortened statutory period, then the
shortened statutory period will expire on the date the advisory action is mailed, and any
extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of
the advisory action. In no event, however, will the statutory period for reply expire later
than SIX MONTHS from the date of this final action.

7.   Any inquiry concerning this communication or earlier communications from the
examiner should be directed to Insun Kang whose telephone number is 703-305-6465.
The examiner can normally be reached on M-F 8:30-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's
supervisor, Kakali Chaki can be reached on 703-305-9662. The fax phone number for
the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the

Patent Application Information Retrieval (PAIR) system. Status information for

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you have questions on access to the Private PAIR system, contact the Electronic

Business Center (EBC) at 866-217-9197 (toll-free).

IK
2/27/2004

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